

Amendments to the Claims

Listing of Claims

1. (Cancelled)
2. (Currently Amended) A method for controlling the dispatch of data on a telecommunication network, the method comprising:
  - receiving one or more data streams at an interface on the telecommunication network;
  - accumulating data from the one or more data streams for each of a plurality of outgoing channels;
  - upon the accumulation of a threshold amount of data for one of the outgoing channels, dispatching the accumulated data;
  - if there is no accumulated data for an outgoing channel then upon the receipt of data for that outgoing channel which is not dispatched immediately, scheduling an expiry time for the outgoing channel and associating the outgoing channel with the expiry time; and,
  - when the expiry time occurs, using the association to identify a group of ~~one or more~~ a plurality of outgoing channels associated with the expiry time and, for the outgoing channels in the group, sending the accumulated data;wherein associating the outgoing channel with the expiry time comprises placing information identifying the outgoing channel in a list associated with the expiry time.
3. (Original) The method of claim 2 wherein the list is a linked list and associating the outgoing channel with the

expiry time comprises placing a pointer to a record associated with the outgoing channel into the linked list.

4. (Original) The method of claim 2 comprising, upon dispatching the accumulated data for an outgoing channel before the expiry time, deleting from the list the association of the outgoing channel with the expiry time.
5. (Previously Presented) The method of claim 4 wherein the list comprises a doubly-linked list and deleting from the list the association of the outgoing channel with the expiry time comprises retrieving information identifying a previous outgoing channel in the doubly linked list and a next outgoing channel in the doubly linked list from a record associated with the outgoing channel.
6. (Currently Amended) The method of claim ~~1~~ 2 wherein dispatching the accumulated data comprises dispatching one or more fixed-size cells.
7. (Original) The method of claim 6 wherein the threshold amount of data is an amount of data required to fill one of the fixed-size cells.
8. (Original) The method of claim 7 wherein data for each outgoing channel is carried by a connection on an ATM telecommunication link and the fixed-size cells are ATM cells.
9. (Original) The method of claim 8 wherein receiving a plurality of data streams at an interface comprises receiving data frames at the interface and accumulating data destined for each of the plurality of outgoing channels

comprises encapsulating the data frames for an outgoing channel according to an ATM adaptation layer protocol.

10. (Currently Amended) The method of claim  $\pm 2$  wherein dispatching the accumulated data comprises sending one or more variable-size packets.
11. (Original) The method of claim 10 wherein the threshold amount of data is less than a maximum amount of data capable of being carried by one of the variable-size packets.
12. (Original) The method of claim 10 wherein the threshold amount of data is equal to a maximum amount of data capable of being carried by one of the variable-size packets.
- 13.-23. (Cancelled)
24. (Currently Amended) A method for controlling the transmission of fixed-sized data cells on a telecommunication link, the method comprising:
  - receiving one or more data streams at an interface to the telecommunication link;
  - assigning data from the data streams into fixed-size cells for transmission across connections in the telecommunication link;
  - upon the creation of a partially-filled cell to be transmitted on a connection, scheduling an expiry time for the partially-filled cell and associating the connection with the expiry time;
  - when the expiry time occurs, using the association to identify a group of ~~one or more~~ a plurality of connections for which there are partially-filled cells all associated

with the expiry time and dispatching the partially-filled cells in the group; and  
providing, in a CU timer memory, areas corresponding to each of a plurality of possible expiry times and wherein associating the connection with the expiry time comprises placing information identifying the connection into an area in the CU timer memory corresponding to the expiry time.

25. (Original) The method of claim 24 wherein placing information identifying the connection into an area in the CU timer memory comprises placing a pointer to a head of a list of one or more records, including a record associated with the connection, into the area in the CU timer memory corresponding to the expiry time.
26. (Original) The method of claim 25 wherein the list comprises a linked list.
27. (Currently Amended) The method of claim 24 wherein using the association to identify a group of ~~one or more~~ a plurality of connections having partially-filled cells all associated with the expiry time comprises traversing a linked list beginning at the location in the CU timer memory corresponding to the expiry time.
28. (Currently Amended) The method of claim 27 comprising maintaining a record for each of the plurality of connections wherein the record comprises a field ~~capable of~~ for holding a pointer to a next one of the records and traversing the linked list comprises retrieving from the location in the CU timer memory a pointer to a first record associated with a first connection and retrieving from the field of the first record a pointer to a second record

associated with a second connection having the same expiry time.

29.-36. (Cancelled)

37. (Currently Amended) Apparatus for forwarding data packets belonging to a plurality of outgoing channels, each outgoing channel carrying data from one or more streams of data, over a telecommunication link, the apparatus comprising:

an outgoing packet assembler connected to place data packets onto the telecommunications link and a combined use timer connected to control the transmission of partially-filled data packets over the telecommunications link, the outgoing packet assembler being configured to provide a partial packet ready signal to the combined use timer upon the creation of a partially-filled data packet containing less than a threshold amount of data;

the combined use timer comprising a timer maintaining a current time value, a calculator connected to determine an expiry time for a partially-filled packet corresponding to a partial packet ready signal, a data structure ~~capable of~~ for holding information identifying groups of partially-filled packets, each group of partially-filled packets identifying a corresponding plurality of partially-filled packets which share a common expiry time and comparison logic connected to signal to the outgoing packet assembler when the common expiry time for a group of ~~one or more~~ partially-filled packets ~~which share a common expiry time~~ has occurred; wherein the data structure comprises a plurality of lists, one of the lists corresponding to each of a plurality of possible expiry times.

38. (Original) The apparatus of claim 37 wherein the lists comprises linked lists.
39. (Original) The apparatus of claim 38 wherein the linked lists comprise doubly linked lists.
40. (Original) The apparatus of claim 39 comprising an interface system comprising control logic, a memory holding a plurality of records, the records containing information regarding states of each of the plurality outgoing channels and a working memory wherein the control logic is configured to load into the working memory a current one of the records.
41. (Currently Amended) The apparatus of claim 40 wherein each of the records comprises a previous connection in list field ~~capable of~~ for holding a pointer identifying a previous record in one of the doubly-linked lists and a next connection in list field ~~capable of~~ for holding a pointer identifying a next record in the doubly linked list, each of the doubly linked lists comprises a set of zero or more records, and the records in any of the sets comprising two or more of the records are linked by pointers in their next connection in list and previous connection in list fields.
- 42.-46. (Cancelled)
47. (New) A method of encapsulating data into fixed length packets for transmission on a plurality of outgoing channels of a communication network wherein data received at an interface is accumulated into the payload field of packets, the method comprising, whenever a partially filled packet is created for an outgoing channel:

- a) scheduling an expiry time for the outgoing channel;
  - b) setting a reference for identifying the outgoing channel; and
  - c) storing the reference in a list, the list comprising a plurality of references, each reference identifying a corresponding outgoing channel for which a corresponding partially filled packet is scheduled to have the expiry time; and
  - c) consulting the list at preset time intervals and transmitting any partially filled packets scheduled for the expiry time at the expiry time,
- wherein transmission of the partially filled packet over the outgoing channel is delayed up to the expiry time, with a view to filling the payload field of the partially filled packet with additional data that arrives at the interface before the expiry time.
48. (New) A method according to claim 47 comprising, if the payload field of the partially filled packet is filled before the expiry time, transmitting the packet without further delay over the outgoing channel.
49. (New) A method according to claim 47 comprising deleting from the list the reference to the outgoing channel upon reaching the expiry time.
50. (New) A method according to claim 48 comprising, if the payload field of the partially filled packet is filled before the expiry time, deleting from the list the reference to the outgoing channel before the expiry time.
51. (New) A method according to claim 47 wherein the list is a linked list or a doubly-linked list.

52. (New) A method according to claim 51 wherein the reference comprises a pointer to a record associated with the outgoing channel.
53. (New) A method according to claim 52 wherein the record comprises a previous connection field with data identifying a previous record for another outgoing channel with another partially filled packet having the expiry time, and a next connection field with data identifying a next record for still another outgoing channel with still another partially filled packet having the expiry time.
54. (New) A method according to claim 47 wherein data for each outgoing channel is carried by an ATM connection and the fixed-size packets are ATM cells.
55. (New) A method according to claim 47 wherein storing the reference in the list comprises:  
    providing a CU timer memory with a plurality of locations, each of the locations corresponding to a possible expiry time; and  
    placing the reference in one of the locations corresponding to the expiry time, for identifying a record associated with the outgoing channel.
56. (New) A combined use (CU) timer system for controlling the transmission delay of fixed size data packets on a plurality of outgoing channels established over a communication network, comprising:  
    a timer for measuring the current time in preset time increments;



an expiry time calculator for establishing a respective expiry time for each partially filled packet which is awaiting transmission on a respective outgoing channel;

a data structure for storing, for each respective expiry time, a list of a plurality of references wherein each of the plurality of references identifies a corresponding outgoing channel with a corresponding partially filled packet that has the respective expiry time;

first logic means for identifying, in the data structure for each time increment, a list having an expiry time equal to the current time and generating a send now signal indicating that any partially filled packet having the expiry time must be transmitted without further delay.

57. (New) A timer as in claim 56 comprising second logic means for deleting references from the data structure upon receipt of a corresponding sent signal.
58. (New) A timer as in claim 57 wherein the sent signal indicates that the partially filled packet has been transmitted at the expiry time.
59. (New) A timer as in claim 57 wherein the sent signal indicates that a particular partially filled packet has been filled and transmitted before the expiry time.
60. (New) A timer as in claim 56 wherein the expiry time is calculated for the partially filled packet by adding a multiple of the preset time increment to a current time when the particular partially filled packet is identified.
61. (New) A timer as in claim 60 wherein the multiple is specific to each outgoing channel.

62. (New) A timer as in claim 60 wherein the multiple is the same for all of the outgoing channels.
63. (New) A timer as in claim 56 wherein the list is a linked list or a double linked list.